OSF d

ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

J. Lamb / K-1034A

Requestor / Document Center (is requested to provide the following document)

Date of request 4/13/95 Expected receipt of document 4/28/95

Document number K-247 parts 1 & 2* Date of document 8/9/48

Title and author (if document is unnumbered) * K/EM-141 - Report of Industrial Hygiene Field Investigations During the First and Second Quarters 1948

(This section to be completed by Document Center)

Date request received 4/13/95

Date submitted to ADC —

Date submitted to HSA Coordinator 4/13/95

(This section to be completed by HSA Coordinator)

Date submitted to CICO 5/9/95 / 5/30/95

Date received from CICO 5/30/95

Date submitted to ChemRisk/Shonka and DOE 6-1-95

(This section to be completed by ChemRisk/Shonka Research Associates, Inc.)

Date document received

Signature

ChemRisk Document No. 1868

K/EM-141

REPORT OF INDUSTRIAL HYGIENE FIELD INVESTIGATIONS DURING THE FIRST AND SECOND QUARTERS 1948

(Sanitized Version of K-247, Parts 1 and 2, dated August 9, 1948)

Compiled by
S. G. Thornton
Environmental Management Division
OAK RIDGE K-25 SITE
for the Health Studies Agreement

May 1995

Oak Ridge K-25 Site
Oak Ridge, Tennessee 37831-7101
managed by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the U.S. DEPARTMENT OF ENERGY
under Contract DE-AC05-84OR21400

This document has been approved for release to the public by:

Arvan S. Quist 5/30/95
Technical Information Officer Date
Oak Ridge K-25 Site

CONFIDENTIAL

K-247, Part 1 and 2 August 9, 1948

REPORT OF INDUSTRIAL HYGIENE FIELD INVESTIGATIONS DURING THE FIRST AND SECOND QUARTERS, 1948

~~CONFIDENTIAL~~ RESTRICTED - RD

TECHNICAL LIBRARY
ROOM 12 K[illegible]

CONFIDENTIAL

CONFIDENTIAL - RD

Approved for issue by [signature] Report Number: K-247, Parts 1 and 2

Date of issue: August 9, 1948

AEC RESEARCH AND DEVELOPMENT REPORT

CARBIDE AND CARBON CHEMICALS CORPORATION
MEDICAL DEPARTMENT
K-25 PLANT

Remains CRD, 4/26/94
Sam W. Wohlfort (ADD)

REPORT OF INDUSTRIAL HYGIENE FIELD INVESTIGATIONS DURING THE FIRST AND SECOND QUARTERS, 1948 (U)

Compiled by N. H. Ketcham

CONFIDENTIAL - RD

CLASSIFICATION CHANGED TO
By authority of W L Harwell on 3/18/54

By A G Gibbs Date 8/17/56

PRD-1-NS

Classification (level and category): REMAINS CRD
ADC or ADD signature (first reviewer): Bascom W. Kelley Date 5/11/95
ADD signature (final reviewer): Ned Reynolds Date

Distribution:

Mr. C. E. Center
Mr. A. P. Huber
Mr. W. B. Humes
A. G. Kammer, M. D.

Chief, Clinton Production Division (3)
Attn: Mr. J. C. Robinson

Electrical Maintenance Division
Attn: Mr. H. R. House

Engineering Development Division
Attn: Mr. S. Cromer

Industrial Relations Division (4)
Attn: Mr. R. R. Wolf
Mr. C. O. Burns
M. J. Costello, M. D. (2)

K-25 Laboratory Division Central Files
(Mr. S. D. Schiffman) (3)
Dr. C. K. Beck
Dr. F. W. Hurd

Maintenance Division (2)
Attn: Mr. B. Speyers
Mr. R. M. Williams

Manufacturing Office
Attn: Mr. J. A. Elkins

Planning Department
Attn: Mr. H. L. Barnett

Plant Engineering Division
Attn: Mr. R. M. Batch

Plant Protection Division
Attn: Mr. J. J. McCarthy

Plant Records Department (2)
Attn: Mr. G. E. Randall

Power Division
Attn: Mr. D. H. Riley, Jr.

Process Division Central File
(Mr. G. E. Stubbs) (5)
Mr. H. W. Carnes
Mr. J. A. Marshall
Mr. J. P. Murray
Mr. G. T. E. Sheldon

Safety and Inspection Division (2)
Attn: Mr. A. P. Dunlap

CONFIDENTIAL-RD

DOE AA
8/2/94

RESTRICTED

CONFIDENTIAL

CONFIDENTIAL

Report number: K-247, Parts 1 and 2

Date of issue: August 9, 1948

Title: Report of Industrial Hygiene Field Investigations During the First and Second Quarters, 1948.

INTRODUCTION

The results of industrial hygiene investigations during the first and second quarters of the year 1948 are summarized. The data includes the results of air analyses for possible chemical contaminants in the atmosphere, and measurements of other factors of potential influence on the health of the personnel, such as noise or heat. Sufficient explanatory comment is included to assist the reader in evaluating the data in terms of the effectiveness of plant health protection activities.

In cases where investigations revealed a condition such that impairment of the health of the workers might result, the findings were specifically discussed with the division or department supervisor.

In many cases, the data reported herein is supplemented by more specific measurements of actual exposure, such as reported quarterly in the Medical Department "Report of Special Chemical and Physical Urine Analyses," plant report number K-186, part 1, First Quarter, 1948; and part 2, Second Quarter, 1948.

The investigations, with the exception of the noise level and sound frequency measurements, were conducted in the field by the personnel of the Industrial Hygiene Group of the K-25 Works Laboratory. The necessary analyses were also performed largely by that group, with the assistance, in certain cases, of other staffs in the K-25 Laboratory Division. The required development of methods of sampling and analysis was also done by the K-25 Laboratory Division. Total noise level and component sound frequency measurements were performed by the K-25 Instrument Engineering Department. The Medical Department gratefully acknowledges the assistance of these staffs in carrying out the above activities contributing to the program of the medical supervision of the plant employees.

CONFIDENTIAL

CONFIDENTIAL

TABLE OF CONTENTS

CONFIDENTIAL

CONFIDENTIAL

SUMMARY OF INDUSTRIAL HYGIENE SERVICES AVAILABLE

Air Flow Measurements

Linear flow measurement (Velometer and rotating vane anemometer)
Direction and nature of flow (smoke tubes)
Static suction for determination of volume of air flow through suction openings (manometer)

Dust Determinations

Light field counting (Bureau of Mines procedure)
Dark field counting
X-ray diffraction identification
Gravimetric determination of atmospheric dust content
Particle size distribution (modified Cascade Impactor)

Heat

Wet bulb-dry bulb temperatures
Radiant heat

Sound

Total noise level (measured in decibels)
Component sound frequency analysis

Air Analyses for Specific Abnormal Constituents

Ammonia
Benzol (MSA Indicator)
Cadmium fume or dust
Carbon Monoxide (MSA Indicator)
Carbon tetrachloride
Fluorine
Fluoride dusts or smokes
Hydrogen chloride
Hydrogen fluoride
Hydrogen sulfide (MSA Detector)
Mercury vapor and dust (GE Vapor Detector, chemical analysis, and selenium sulfide detector)
Nickel dust
Nitrite nitrogen (nitrous fumes)
Phosgene (CWS detector)
Total organic vapor (activated carbon collection)
Trichloroethylene
Trifluorochloroethylene
Uranium (dust or vapor)

CONFIDENTIAL

It is to be noted that the equipment used in making the above listed investigations makes a wide variety of additional investigations possible, usually requiring advance notice that such investigations are desired. The possible variety is illustrated by the following partial list of equipment and facilities available.

Collection Apparatus

Midget Impingers
Electrostatic Precipitators
Filter paper collectors
Liquid Absorbers
"Grab" sample containers
Bausch and Lomb Dust Counter
Modified Cascade Impactor
Activated carbon collector
Pyrolysis sampler

Specialized Analytical Facilities

Emission Spectrograph
Infrared Absorption Spectrometer
Polarograph
X-ray Diffraction Units
Spectrophotometers
Colorimeters
Ramon Spectrograph

Of particular potential future use is the method recently developed by the Works Laboratory for the pyrohydrolysis of mixed fluoro-chloro hydrocarbons, making possible the quantitative detection of such materials even in the presence of chlorinated hydrocarbons, or other organic vapors. It is anticipated that this method used by itself or in conjunction with infrared absorption analysis, or other techniques, will lead to valuable data in the relatively new field of the industrial hygiene aspects of the mixed fluoro-chloro hydrocarbons.

These techniques are currently being used in investigations to determine the extent of trifluorochloroethylene present in the atmosphere in the polymerization room of Building K-413. Also, similar investigations are in progress to identify and obtain quantitative air analyses for the obviously toxic end products resulting when UF_6 is reduced with trichloroethylene.

SUMMARY OF LOCATIONS IN WHICH INVESTIGATIONS

WERE MADE DURING THE FIRST AND SECOND QUARTERS, 1948

Note: The following list does not include the locations which currently only require periodic observation. Many locations not listed below have been investigated during the four year period of the existence of the industrial hygiene program, but at present are merely observed periodically or reinvestigated following operational changes which might influence the health aspects of the working environment.

Building	Room or Area	Investigation	Number of Air Samples Taken
K-25	K-303-3, Cell #1	Heat	One investigation of wet-dry bulb temperatures, linear air flow, sound volume, and sound frequency analyses.
K-25	K-303-3, Cell #1	Sound	
K-25	K-302-5, Cell #1	Heat	
K-25	K-302-5, Cell #1	Sound	
K-27	K-402-6, Cell #5	Heat	
K-27	K-402-6, Cell #5	Sound	
K-413	Polymerization area	Trichloroethylene	4
K-413	Polymerization area	Total organic vapor	26
K-413	Polymerization area	Total fluorocarbons (as CF_2:CFCl)	2
K-1004-A	Room 18	Mercury	6
K-1004-A	Room 20	Uranium	1
K-1004-A	Room 22	Mercury	13
K-1004-A	Room 22	Nitrous fumes	1
K-1004-A	Room 22	Total acids (HCl and HNO_3)	1
K-1004-A	Room 23	Mercury	3
K-1004-A	Room 59	Mercury	3
K-1004-A	Room 63	Mercury	4
K-1004-A	Room 68	Mercury	1
K-1004-C	Room 207	Mercury	8
K-1004-C	Room 214	Mercury	3
K-1004-C	Room 215	Mercury	10
K-1004-C	Room 219	Mercury	3
K-1004-C	Room 220	Mercury	3
K-1004-D	Room 005	Mercury	3
K-1004-D	Room 04	Mercury	2
K-1004-D	Room 05	Mercury	3
K-1004-D	Room 05	Total acids	2
K-1004-D	Room 05	Hydrogen fluoride (and fluoride dusts)	5
K-1004-D	Room 05	Uranium	4
K-1004-D	Room 05	Trichloroethylene	19
K-1004-D	Room 05	Phosgene	7
K-1004-D	Room 07	Beryllium	1
K-1004-D	Room 08	Mercury	3
K-1004-D	Room 09	Mercury	2

Building	Room or Area	Investigation	Number of Air Samples Taken
K-1004-D	Room 3	Mercury	11
K-1004-D	Room 4	Mercury	10
K-1004-D	Room 8	Nitrous fumes	1
K-1004-D	Room 8	Mercury	10
K-1004-D	Room 11	Trichloroethylene	2
K-1004-D	Room 11	Mercury	9
K-1004-D	Room 12	Mercury	6
K-1004-D	Room 17	Hydrogen fluoride	2
K-1004-D	Room 17	Mercury	4
K-1004-D	Room 17	Hydrogen sulfide	1
K-1004-D	Room 19	Mercury	3
K-1004-D	Room 19	Hydrogen fluoride	2
K-1004-D	Room 20	Mercury	2
K-1004-D	Room 21	Uranium	1
K-1004-D	Room 21	Mercury	3
K-1004-D	Room 22	Mercury	3
K-1004-D	Stockroom	Mercury	4
K-1024	Room 4	Mercury	9
K-1024	Room 7	Mercury	6
K-1024	Room 10	Mercury	8
K-1024	Room 13	Mercury	19
K-1024	Room 14	Mercury	6
K-1024	Room 22	Mercury	1
K-1024	Utility closet	Mercury	4
K-1030	Cleaning room	Carbon tetrachloride	10
K-1035	Laboratory storage area	Mercury	3
K-1037	Testing laboratory	Mercury	63
K-1037	Manufacturing area	Nickel	30
K-1049	Garage area	Carbon monoxide	8
K-1050	Garage area	Carbon monoxide	8
K-1050	Paint shop	Enamel spraying	3
K-1095	Room 1	Mercury	2
K-1095	Room 2	Mercury	2
K-1095	Room 3	Mercury	2
K-1095	Room 5	Mercury	10
K-1095	Supply room	Mercury	1
K-1301	Conversion room	Fluorine	2
K-1301	Cubicle #3	Fluorine	1
K-1301	Grinding room	Uranium	4
K-1302,cells #1,2,3,& 4	Storage tanks (inspection)	Fluorine (also HF)	10
K-1303	Decontamination room	Nitrous fumes	14
K-1303	Decontamination room	Mercury (stills)	18
K-1303	Cubicle #5	Ammonia	1
K-1401	Cleaning area (converter welding)	Cadmium fume	2
K-1401	Cleaning area (converter welding)	Uranium	4
K-1401	Cleaning area (converter welding)	Hydrogen fluoride	2
K-1401	Cleaning area (converter welding)	Nickel	2

Building	Room or Area	Investigation	Number of Air Samples Taken
K-1401	Cleaning area (degreaser)	Trichloroethylene	104
K-1401	Cleaning area (CWS cylinders)	Trichloroethylene	18
K-1401	Cleaning area (CWS cylinders)	Phosgene	2
K-1401	Pump shop (degreaser)	Trichloroethylene	10
K-1401	Carpenter Shop	Dust (wood and Transite)	8
K-1401	Storeroom, furnace area	Mercury	2
K-1401	Works laboratory, room 22	Mercury	1
K-1401	Research Laboratory, room 204	Mercury	20
K-1401	Research Laboratory, room 210	Mercury	36
K-1401	Research Laboratory, room 215 B	Dust (silica)	4
K-1401	Research Laboratory, room 215 N	Mercury	35
K-1401	Research Laboratory, room 252	Mercury	31
K-1401	Research Laboratory, room 254	Mercury	1
K-1401	Barrier shop	Uranium	2
K-1401	Barrier shop	Nickel	2
Manhole	North of K-1004-C	Combustibles	1
Manhole	North of K-1004-C	Oxygen deficiency	1

SUMMARY OF DATA AND DISCUSSION OF

INVESTIGATIONS MADE DURING THE FIRST AND SECOND QUARTERS, 1948

Note: The following summaries and discussions are designed to assist in evaluation of the effectiveness of plant health protection activities. For this purpose, comparative reference is made in many cases to "maximum allowable concentration" figures. However, comparisons of air analyses with maximum allowable concentration figures can at best serve only as an indication of the relative exposure level. In most cases, such comparison provides very little, if any, assistance in the actual evaluation of the extent of injury sustained or to be expected in a specific circumstance.

Investigations for Heat and Noise

One series of investigations of heat and noise conditions inside operating cell enclosures was made. Two cell enclosures in K-25 and one cell enclosure in K-27 were used for the study. Measurements of total noise level and sound frequency analyses were made in each cell enclosure. Also, measurements of wet-dry bulb temperatures, radiant heat, and linear air flow were made.

On the basis of the data obtained, it was concluded that while the heat conditions might have contributed to personnel discomfort and to reduced work output, the heat per se was not likely to result in impairment of the health of the workers. The "effective temperatures" ranged from 84°F to 91°F. It is generally considered that the maximum allowable effective temperature is in the range of 86°F to 87°F. The wet bulb temperatures varied from 70°F to 77°F. Wet bulb temperatures up to 75°F are considered to be in a "comfort" range. From 75°F to 82°F production loss and mild discomfort are expected. Alternate 20 minute work and rest periods are provided, together with the means of maintaining adequate water and salt intake.

The noise conditions were judged to be a large factor contributing to the psychological distress of the personnel and to be in a range such that hearing impairment could result. Total noise ranged from 103 to 108 decibels, with considerable of the total consisting of 500 to 2,000 cps frequencies. The maximum allowable sound level is 90 decibels. However, the susceptability of individuals to hearing impairment due to noise exposure varies widely. Arrangements to provide ear protection equipment have been initiated, and periodic audiometric testing has been instituted as part of the industrial health medical examinations of the personnel concerned.

Air Analyses for Nickel

Three areas were investigated to determine the extent of air contamination resulting from operations involving small particle size nickel dust, or in one case, possible nickel oxide fume. Nickel metal per se is generally considered to be among the less toxic metals. (Nickel carbonyl is known to be quite toxic.) No maximum allowable concentrations have been established for nickel. For the purposes of this report concentrations equaling or exceeding 0.5 mg. Ni/m^3 are considered of possible significance if prolonged exposures were to be undergone.

The results of air analyses for nickel are summarized below:

Location	Number of Analyses	Number of Analyses above 0.5 mg. Ni/m^3
K-1037	30	2*
K-1401, cleaning area (converter welding)	2	0
K-1401, Barrier Shop	2	0

* Dust respirators are used by the personnel.

Air Analyses for Mercury

Of the 49 areas in which a total of 415 air analyses were made for mercury vapor, nine analyses representing seven areas were above the maximum allowable concentration of 0.1 mg. Hg/m^3. The following summary of the analyses above 0.1 mg. Hg/m^3 confirms the conclusion reached on the basis of urinary mercury analyses (Medical Department Report K-186, parts 1 and 2) that some random mercury vapor exposure does still occur, but that chronic exposure to possibly harmful levels has been eliminated.

Location	Total Number of Samples	Number of Analyses above 0.1 mg. Hg./m^3	Comment
K-1004-A, Rm. 22	13	1	Known mercury spill
K-1004-C, Rm. 215	10	1	Known mercury spill
K-1004-C, Rm. 207	8	1	Known mercury spill
K-1004-D, Rm. 12	6	1	Known mercury spill
K-1037, Testing Lab	63	2	Known mercury spills
K-1095 (Old F-05)	17	2	Residual contamination from Fercleve operation. Cleaned up, and subsequent analyses showed contamination effectively removed.
K-1303 (Hg. Stills)	18	1	(Analysis was 0.10 mg. Hg./m^3).

Air Analyses for Trichloroethylene

Of the six areas in which a total of 157 air analyses were made for trichloroethylene vapor, twenty-three analyses representing five areas were somewhat above the maximum allowable concentration of 200 ppm. Due to the intermittant nature and short duration of the personnel exposures to these concentrations, they are not considered injurious. This conclusion is strengthened by the lack of evidence of personnel injury as determined from the medical examinations of the men concerned.

The analyses over 200 ppm were obtained in the following locations:

Location	Total Number of Analyses Made	Number of Analyses above 200 ppm	Comment
K-413	4	3	(TCE transfer, not normal operation)
K-1004-D, Rm. 05	19	3	
K-1004-D, Rm. 11	2	2	(TCE distillation, not normal operation)
K-1401, Cleaning Area Degreaser	104	12	
K-1401, Pump Shop Degreaser	10	3	

Air Analyses for Carbon Tetrachloride

The use of carbon tetrachloride for general manual degreasing or cleaning purposes has been discouraged, with less toxic substitutes such as trichloroethylene

or petroleum distillate suggested. Carbon tetrachloride is used in the K-1030 Building for degreasing electrical equipment, in which application substitution of other solvents has proven impractical. The degreaser is a modern, closed, ventilated unit and when operated carefully does not result in contamination of the working area atmosphere in excess of the maximum allowable concentration of 75 ppm. Of ten air analyses made in the working area while degreasing was in progress, nine were less than, or only slightly in excess of 75 ppm. One short duration atmosphere contamination level of 2,000 ppm illustrated the need for continued careful observance of the prescribed degreasing and drying procedure.

Air Analyses for Uranium

A total of sixteen air samples representing six areas were taken for uranium analysis. In all cases, the air sampling was a special investigation, as the regularly scheduled monitoring for air or surface uranium contamination was reorganized late in 1947 as a part of the present health physics program, reported monthly in the Radiation Hazards Department Report of Health Physics Activities, Plant Report K-178.

Specific evaluation of the extent of the inhalation or ingestion of uranium by plant personnel is reported in the Medical Department Report of Special Chemical and Physical Urine Analyses, Plant Report K-186.

Based upon the above sources of information and upon the medical findings resulting from the periodic industrial health medical examinations, it is apparent that significant chronic inhalation or ingestion or uranium has been effectively avoided.

The results of the above sixteen air samples analyzed chemically for uranium are summarized below. The maximum allowable concentration for uranium, considered as a toxic chemical, is 0.15 mg. U/m^3.

Location	Total Number of Analyses	Number of Analyses above 0.15 mg. U/m^3	Comment
K-1004-A, Rm. 20	1	1	Following known "leak"
K-1004-D, Rm. 05	4	2	This job no longer done in Rm.05
K-1004-D, Rm. 21	1	0	Following known "leak"
K-1301, Grinding Rm.	4	4	See below*
K-1401, Cleaning Area	4	0	During converter head removal
K-1401, Barrier Shop	2	0	During barrier cutting

* This is a very dusty job. Personnel wear protective equipment. The operations staff is making efforts to redesign the equipment to eliminate the need for opening it during the dusty phase of the process.

Air Analyses for Fluorine (and HF)

A total of 24 air samples were taken for fluorine and hydrogen fluoride analyses. Ten of the samples were taken in the purge gas from storage cells in the K-1302 building while those cells were being purged prior to entry for equipment inspection purposes. The other areas investigated were K-1004-D, rooms 05, 17, and 19, the K-1301 conversion room, K-1301 cubicle #3, and the K-1401 cleaning area converter head removal operation. Except for one sample in K-1004-D, room 05, and some of the purge gas samples, no concentrations were found to be above the maximum allowable concentrations of 1 ppm for fluorine or 3 ppm for hydrogen fluoride. The operation in K-1004-D, room 05, has been discontinued at that location.

Air Analyses for Trifluorochloroethylene

The possible presence of trifluorochloroethylene (CF_2:CFCl) in the atmosphere in the K-413 Building presented a potential problem, as preliminary unpublished animal studies indicated CF_2:CFCl was quite toxic. Other contaminants such as trichloroethylene, ethanol, and possibly Freon 113, were also present in the atmosphere, making the analysis for CF_2:CFCl difficult. Concurrent investigations of the possibil-

ity of using infrared absorption or pyrohydrolysis methods of analysis were initiated by the Research and Works Laboratories, respectively. The infrared analysis, using a 10 cm cell, proved selective for CF_2:CFCl, but not sufficiently sensitive. The Works Laboratory recently made available a suitably sensitive pyrohydrolysis method of analysis which was initially used in June. Two initial analyses using the pyrohydrolysis method of analysis showed a total fluorocarbon content (CF_2:CFCl plus CF_2Cl-CCl_2F) in the atmosphere in the order of 2 ppm, which compared favorably with a tentative maximum allowable concentration of 10 ppm for CF_2:CFCl. These two analyses were made simultaneously with two analyses for total organic vapor concentration. The total vapor concentration was in the range of 60 ppm, that concentration consisting largely of trichloroethylene. This investigation is being continued.

A total of twenty-six analyses were made for total organic vapor concentration prior to the pyrohydrolysis and infrared methods being made available. Due to the non-specific nature of the determination the data is of little value.

Air Samples for Dust Counts (Wood and Transite)

A series of eight air samples were taken in the K-1401 Building, Carpenter Shop. As Transite is infrequently sawed in this shop, the stringent maximum allowable concentration of 5 millions of particles per cubic foot is used. The data is summarized below:

Location	Number of Samples Taken	Number of Counts above 5 MPPCF
Center of shop, normal operations	1	0
East end of shop, normal operations	1	0
12 ft. from wood sawing operation	1	0
3 ft. from wood sawing operation	1	0
By operator at planing machine	1	0
By operator sawing Transite	2	2*
20 ft. from operator sawing Transite, not in visibly dusty area.	1	0

* Protective respiratory equipment is supplied.

Air Analyses During Enamel Spraying

Three air samples were taken on activated carbon collectors during spraying operations in the K-1050 Building garage paint shop. The coatings are largely enamels using petroleum distillate thinners. Lacquers are infrequently used.

All three analyses showed solvent and pigment present in the working atmosphere in the range from 1500 to 1900 mg/m^3. The maximum allowable concentration for petroleum distillate solvents is usually considered to be in the order of magnitude of 1,000 - 2,000 mg/m^3, but this figure is of questionable validity in evaluating the health aspects of a spraying operation of this nature. Personnel respiratory protective equipment is used.

Air Analyses for Nitrous Fume

A total of sixteen air analyses for nitrous fume were made in three working areas. The maximum allowable concentration for nitrous fume is 25 ppm. The results of the analyses are summarized below:

Location	Number of Samples Taken	Number of Samples above 25 ppm
K-1004-A, Rm. 22	1	0
K-1004-D, Rm. 8	1	0
K-1303, Decontamination room	14	4*

* Obtained during initial operation of a newly constructed nitric acid decontamination unit. Personnel respiratory protective equipment was used.

Air Analyses for Phosgene

Nine air analyses were made for phosgene, using a CWS chemical agent detector kit. In no case was phosgene detected. The analyses were made in the following

locations:

Location	Number of Air Analyses
K-1004-D, Rm. 05	7
K-1401, Cleaning Area (Welding on recently degreased CWS cylinders)	2

Air Analyses for Total Acids

Three air samples were taken for total acidity determinations. A temporary activity involving a digestion in aqua regia in room 22, K-1004-A resulted in one analysis for total acids in excess of the maximum allowable concentration of 10 ppm acid (calculated as HCl). A concurrent air analysis for nitrous fumes, however, was below the maximum allowable concentration for that contaminant. The operation has been discontinued. A special investigation of an operation in room 05, K-1004-D also resulted in one air analysis in excess of 10 ppm total acid. This was not, however, representative of the atmosphere the personnel were breathing. The operation is no longer conducted in that location.

The results of air analyses for total acids are summarized below:

Location	Number of Analyses	Number of Analyses above 10 ppm
K-1004-A, Rm. 22	1	1
K-1004-D, Rm. 05	2	1

Miscellaneous Air Analyses

Location	Sampled for	Number of Samples	Maximum Allowable Concentration	No. of Samples above the maximum allowable concentration
K-1004-D, Rm. 07	Beryllium	1	Not established	Result: (<0.00 mg.Be/m^3)
K-1004-D, Rm. 17	Hydrogen Sulfide	1	20 ppm	0
K-1049	Carbon monoxide	8	100 ppm	0
K-1050	Carbon monoxide	8	100 ppm	0
K-1303, cubicle #5	Ammonia	1	100 ppm	0
K-1401, Rm. 215 B (Res. Lab)	Silica (Dust Count)	4	5MPPCF	0
K-1401, Cleaning Area	Cadmium	2	0.1 mg. Cd/m^3	0
Manhole north of K-1004-C	Combustibles	1	(No combustibles detected)	
Manhole north of K-1004-C	Oxygen deficiency	1	(Normal oxygen content)	

DISTRIBUTION

1. K-25 Site Records (RC)
2. ChemRisk/Shonka Research Associates
3. DOE Public Reading Room
4. S. G. Thornton (K-25 EMD)